UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/565,945	04/17/2006	Katsumi Shibayama	46884-5451	8454

55694 7590 04/28/2009

DRINKER BIDDLE & REATH (DC)
1500 K STREET, N.W.
SUITE 1100
WASHINGTON, DC 20005-1209

EXAMINER	
LAM, CATHY N	

ART UNIT	PAPER NUMBER
2811	

MAIL DATE	DELIVERY MODE
04/28/2009	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/565,945	SHIBAYAMA, KATSUMI	
	Examiner	Art Unit	
	CATHY N. LAM	2811	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *01/23/2009*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1 and 3-8* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1 and 3-8* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

2. Claims 1, 3-8, are rejected under 35 U.S.C. 103(a) as being unpatentable over the Applicant's Admitted Prior Art (AAPA) in view of Ogiu et al. (Pat # 5,098,630), and further in view of Akio (US 5, 691,548).

Regarding claim 1, AAPA fig. 32 shows a back illuminated photodetector comprising:

a first conductive type (n-type) semiconductor substrate 101;

a second conductive type impurity semiconductor region 102 (P+ type) provided in a first superficial surface layer of the said semiconductor substrate 101;

a recessed portion (U shaped groove) for incidence of to-be-detected light formed in a second surface of the said semiconductor substrate and in an area opposite said impurity semiconductor region; and a window plate 113.

AAPA does not disclose a coating layer made of resin for transmitting said to-be-detected light to said recessed portion and having a substantially flat surface, said coating layer being provided on the second surface; and wherein said coating laver

consists of a first resin layer provided on the second surface and a second resin layer provided on said first resin layer and having said substantially flat surface on the opposite side of said first resin laver.

In the same field of endeavor, Ogiu discloses a coating layer 21 fig.5 (col.3, line 50) made of resin (col.3 line 49) for transmitting said to-be-detected light to said recessed portion and having a substantially flat surface, said coating layer being provided on the second surface fig.5, and wherein said coating laver consists of a first resin layer 21 (col.3 lines 49-50) provided on the second surface fig.5 and a second resin layer 22 (col.3 line 49) provided on said first resin layer 21 and having said substantially flat surface on the opposite side of said first resin laver 21 fig.5.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to include a coating layer made of resin for transmitting said to-be-detected light to said recessed portion and having a substantially flat surface, said coating layer being provided on the second surface; and wherein said coating laver consists of a first resin layer provided on the second surface and a second resin layer provided on said first resin layer and having said substantially flat surface on the opposite side of said first resin laver, in order to covering the image surface (abstract) and reduce the dimension of the device (col.1, line 33-34).

Neither AAPA nor Ogiu discloses said first resin layer is arranged in such a manner that a portion of the first resin laver provided on said recessed portion in the second surface is sunk lower than a portion of the first resin laver provided on an outer

edge portion of said recessed portion, and a window plate provided on said substantially flat surface to transmit said to-be-detected light to said coating layer.

Akio discloses said first resin layer 76 (col.10 lines 38-42) is arranged in such a manner that a portion of the first resin laver 76 provided on said recessed portion in the second surface is sunk lower than a portion of the first resin laver 76 provided on an outer edge portion of said recessed portion fig.5B, and a window plate 54 (col.10 line 53) provided on said substantially flat surface 53 (col.10 line 50) fig.5B to transmit said to-be-detected light to said coating layer.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to include said first resin layer is arranged in such a manner that a portion of the first resin laver provided on said recessed portion in the second surface is sunk lower than a portion of the first resin laver provided on an outer edge portion of said recessed portion, and a window plate 113 provided on said substantially flat surface to transmit said to-be-detected light to said coating layer, in order to provide the overcoat layer may be operative to be the concave type micro-lens layer (col.5 lines 4-6).

Regarding claim 3, AAPA discloses the back illuminated photodetector according to claim 1, further comprising a supporting film (not labeled but on the first surface) provided on the first surface of said semiconductor substrate to support said semiconductor substrate fig.32.

Regarding claim 4, AAPA discloses the back illuminated photodetector according to claim 3, further comprising a filling electrode 105 penetrating through the supporting film and connected electrically to the impurity semiconductor region 103 at one end thereof fig.32.

Regarding claim 5, AAPA discloses the back illuminated photodetector according to claim 1 wherein said window plate 113 has a square cross-sectional shape with at least one comer being chamfered in a plane perpendicular to the thickness direction thereof fig.32.

Regarding claim 6, AAPA disclose the back illuminated photodetector according to claim 1, wherein a highly-doped impurity semiconductor region 103 with impurities of said first conductive type added thereto at a high concentration (n+ type) is exposed fig.32.

AAPA does not disclose a highly-doped impurity semiconductor region across the entire side surface of said semiconductor substrate.

I would have been obvious to one of ordinary skill in the art at the time the invention was made to modify a highly-doped impurity semiconductor region teaching of AAPA to a highly-doped impurity semiconductor region across the entire side surface of said semiconductor substrate as claimed, in order to have design type of device.

Regarding claim 7, AAPA disclose the back illuminated photodetector according to claim 1, wherein a highly-doped impurity semiconductor layer with impurities of the first conductive type added thereto at a high concentration (n+ type) 103 is provided in a

bottom portion of the recessed portion within the second superficial surface layer of the semiconductor substrate 101 fig.32.

Regarding claim 8, AAPA disclose the back illuminated photodetector according to claim 1, wherein a highly-doped impurity semiconductor layer with impurities of said first conductive type added thereto at a high concentration (n+ type) 103 is provided in a second superficial surface layer in an outer edge portion of said semiconductor substrate 101 fig.32.

Response to Arguments

3. Applicant's arguments with respect to claims 1, 3-8 have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

4. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of

the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to CATHY N. LAM whose telephone number is (571)270-5021. The examiner can normally be reached on M-F 7:30AM to 5PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, LYNNE GURLEY can be reached on 571-272-1670. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

CL
4/14/2008

/Cuong Q Nguyen/

Primary Examiner, Art Unit 2811